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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,154	01/28/2004	Kai Xu	BW-DKT03146	3413
32175	7590	05/25/2005	EXAMINER	
BORGWARNER INC. 3850 HAMLIN ROAD AUBURN HILLS, MI 48326			JENKINS, DANIEL J	
			ART UNIT	PAPER NUMBER
			1742	
DATE MAILED: 05/25/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/766,154

Applicant(s)

XU ET AL.

Examiner

Daniel J. Jenkins

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/14/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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1. The Examiner has carefully considered Applicant's Response of 1/31/05. The Examiner finds that Kosco '747 further teaches the tempering step and adds that limitation to the rejection. However, the Examiner has replaced the Sonti et al. reference with Graupner et al. to improve the Examiner's position that grinding is a known step in the art, and the Action is accordingly not made final. Additionally, the Examiner adds the reference by Kempe et al. to show the amended limitation to the formation of a groove in the teeth.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosco '747 in view of Baran et al. and Graupner et al. and Kempe et al.

Kosco discloses a method of forming a part comprising:

providing a metal powder comprising:

0.3 to 0.8% carbon (col. 3, line 2);

up to 2% nickel (col. 5, line 52);

up to 2% molybdenum (col. 5, line 50);

up to 0.7% manganese (col. 5, line 51); and

up to about 4% chromium (col. 5, lines 51-52);

compressing the metal powder at 20-70 tsi to form a green compact (col. 7, lines 34-41);

heating the green compact at a temperature of 2000°F to 2400°F for 25-30 minutes for a sufficient time to ensure homogeneous alloying (col. 7, lines 41-58);  
forming a densified portion of the heated green compact (col. 8, lines 35-59);  
heating the densified compact in the range of 2050°F to 2400°F for at least 20 minutes (col. 8, lines 60-64); and  
cooling the compact under rates and times to form tempered martensite (col. 8, line 60 to col. 9, line 16).

Kosco further discloses wherein the forming a densified portion includes hot forming at a temperature of 1800°F for 3 minutes (see Example 2), in the temperature limitation of Applicant's step d) but for less time. The Examiner finding that the time limitation of a small part such as a race would lead to total heating of the part, resulting in the same desired effects as claimed.

Kosco thus differs from the claimed invention by the alloy additions and the full range of various temperature treatments.

Kosco is silent as to other claimed alloy additions including Si, but states that known alloy additions can be added to his metal powder composition (col. 5, lines 31-67).

Baran et al. teaches to add alloy additions to steel including less than 1% Si (pp 1-2) in order to improve the corrosion resistance and phase stability.

It would have been obvious to one having ordinary skill in the art at the time of the invention to add Si as taught by Baran et al. to the steel composition of Kosco in order to improve corrosion resistance and phase stability of the steel of Kosco.

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Kosco further discloses heating parameters selected for the same purposes as disclosed by Applicant, and would be modified by one of ordinary skill based on the selection of the initial starting alloy in order to achieve the same utility as the disclosed invention.

Kosco '747 further discloses wherein the first cooling step is performed so as to not harden the microstructure, leaving a non-martensitic microstructure of one or more of Pearlite, Ferrite + Pearlite, or Bainite microstructure depending upon where in the cooling range cooling is performed, leaving a hardness of about 6.2 to 7.2 g/cc (col. 7, line 59 to col. 8, line 7).

However, Kosco '747 is silent as to grinding as a working step.

Graupner et al. teaches at col. 5, lines 2-6, that grinding can be performed on formed powder metal gears after a heating step for the purpose of achieving a desired level of accuracy of formation.


It would have been obvious to one having ordinary skill in the art at the time of the invention to incorporate grinding into the working operation of Kosco '747 after sintering as taught by Graupner et al. in order to improve accuracy of the formed gear. The Examiner finds that the grinding would not be added later in the process, which would defeat the hardening of the formed article.

Additionally, Kempe et al. teaches that known gear geometry includes grooves between rows of teeth, in the same field of endeavor, the finishing of said rows to final tolerance performed by the disclosed process steps.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Jenkins whose telephone number is 571-272-1242. The examiner can normally be reached on M-TH6:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1242. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel J. Jenkins  
Primary Examiner  
Art Unit 1742

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